Single-Chip USB Controller Reading Power-On Boot Code from Integrated Flash Memory for User Storage

Abstract

A Universal-Serial-Bus (USB) single-chip flash device contains a USB flash microcontroller and flash mass storage blocks containing flash memory arrays that are block-addressable rather than randomly-addressable. USB packets from a host USB bus are read by a serial engine on the USB flash microcontroller. Various routines that execute on a CPU in the USB flash microcontroller are activated in response to commands in the USB packets. A flash-memory controller in the USB flash microcontroller transfers data from the serial engine to the flash mass storage blocks for storage. Rather than boot from an internal ROM coupled to the CPU, a boot loader is transferred by DMA from the first page of the flash mass storage block to an internal RAM. The flash memory is automatically read from the first page at power-on. The CPU then executes the boot loader from the internal RAM to load the control program.